



SPANISH TECHNOLOGY PLATFORM OF THE AUTOMOTIVE COMPONENTS SECTOR



Plataforma de la automoción





SERtec

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1. Introduction

This document aims to provide a view of the industry up to the year 2020 as well as a Strategic Plan both for companies, technology centres and universities and for public authorities at all levels (European, national and regional), helping them to define and implement lines of support to increase R&D in the Sector and gear resources towards the existing demand and capacities. This is combined with an analysis of the industry as a whole, which is completed with the objectives of the European Platform ERTRAC and, in our more specific case, with the guidelines set by the constructors.

The members of the SERtec Platform have been working in these groups with a view to establishing the R&D priorities of the Sector in Spain and emphasising the courses of action which are strategic, whether it be because of the existing capacity, the potential of the companies that carry out R&D in our country or the technological challenge it poses for the vehicle, thereby giving companies, technology centres and universities the opportunity to be present in the vehicles of the forthcoming decades.

Another aspect discussed by these groups is the interrelationship of different technologies which have great potential in our country but which are not "traditional" in the automotive industry. The integration of these groups and their collaboration on projects could also be a decisive factor in

enabling automotive suppliers to add greater value to their products.

However, it is worth emphasising that a number of recurring topics exist in various areas based on different approaches.



2. Analysis of the sector. The need to create SERtec

Spanish manufacturers of automotive components and equipment constitute a strong and competitive industry on a worldwide scale. Spain has been a receiver of foreign investment in this Sector for 30 years, and the leading multinationals are established here. At the same time, Spain has developed its own industry with the help of certain Spanish capital groups which are also firmly established abroad, and above all it has built up a high-quality 2nd and 3rd level supply chain. In 2007 the industry provided employment for 250,000 people and recorded a turnover of 32,873 million €, with exports accounting for over half of this turnover, mainly to Europe.

These companies are being forced to carry out R&D tasks at the request of their clients (vehicle manufacturers), mainly due to the constant need to surmount technical barriers for new applications, but also because of new regulatory requirements. Expenditure on R&D as a proportion of turnover for component and equipment suppliers already exceeds that of the manufacturers. For this group, the average investment in Spain is about 3%, being considerably higher in the case of the major national suppliers with their own capacity.

In spite of this, there are several sub-sectors in which the number of companies that carry out R&D activity is very low. This might be due to the fact that the factories located in Spain focus exclusively on manufacturing, whereas all R&D activity is carried out by the parent companies, i.e. outside Spain.

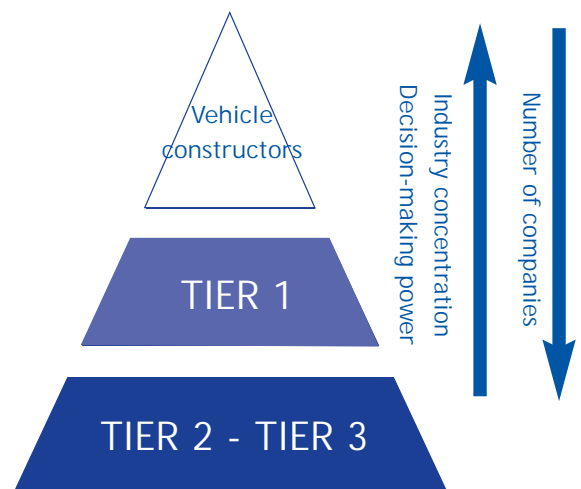
This is why the Spanish Platform, SERtec, unlike its European counterpart, has focused on component suppliers, given that the clients -vehicle constructors- do not have decision centres in Spain and all the R&D activity takes place beyond our borders. Nevertheless, Spanish suppliers are investing heavily in R&D in order to be able to carry out their clients' projects and consolidate their strategies.

Manufacturers and Suppliers:

An asymmetrical balance of power.

- ✓ Transfer of risks to the supplier
- ✓ Unilateral renegotiation of contracts
- ✓ Lack of transparency in purchases
- ✓ Depletion of the supplier's financial resources
- ✓ Unnegotiated surcharges

Source: Profesor Nuevo / FITSA



Some paradoxes in the Sector as a whole:

- ✓ Small return/profit in comparison with its size/sales
- ✓ Heavy concentration and difficulty in competing
- ✓ Despite being accessible, the Know-how is used by very few
- ✓ Concerted efforts in the field of technology, public demand for which is then not promoted

Source: Profesor Nueno / FITSA

SECTOR TRENDS

- ✓ Reduction in the number of decision centres
- ✓ Increase in purchase volumes
- ✓ Increase in the number of Customers' production plants
- ✓ Increase in the size of companies
- ✓ Transfer of non-strategic competencies
- ✓ Reduction of the time taken to launch new products
- ✓ Sophistication of the leisure/comfort/safety demand
- ✓ Incorporation of technological innovations: electronics, communications, materials
- ✓ Minimisation of total cost during the product's life cycle

ECONOMIC CHALLENGES

Adequate financial structure

In order to meet growing funding requirements

Sufficient critical mass

Component manufacturers must increase their size in order to be able to keep up with the pace set by Constructors

TECHNICAL CHALLENGES

Surmounting technical barriers

More launches of new models, greater demand for quality, environmental design, etc.

The phenomenon of globalization

Eastern Europe is becoming the major competitor. At the same time, new business opportunities are being generated: China, Mexico,...

Flexibility

Meaning the ability to adapt: the Component Manufacturer must participate in joint projects with the Vehicle Constructor, thus supplying products with greater added value

The entry into the market of Low Cost Countries (LCC) and the complete globalization of the industry is forcing Spanish companies to change the way they are run, alter their structure and, above all, make significant investments in innovation in order to be able to compete in this framework.

Vehicle manufacturers (clients) are transferring their investments to these markets (East European countries, Asia) and asking their suppliers to follow suit and develop the supply chain of these markets. Companies in Spain need to work together to make sure that the know-how acquired in Spain becomes a competitive advantage in response to these trends, while at the same time improving productivity, which is still a key factor for keeping investments here.

In a global market, with a product as competitive as the car and high pressure on

costs, it is vitally important to develop product innovations which improve costs, reduce assembly times and comply with strict regulations.

Introducing changes in processes, as well as in products, is becoming a key factor in our country as far as innovation is concerned:

- Integration of activities in the chain of value as a key factor of global competitiveness.
- Manufacturing flexibility
- Logistical optimisation

The Sector is one of the most heavily regulated, with stringent safety and environmental regulations which will represent demanding challenges for companies from now until 2015, and which also require significant investments. Meeting these requirements is likely to be a key element for survival in the market:



- ✓ **Environment.** KYOTO, CO₂ reduction and the recycling of end of life vehicles will be key factors in the coming years. These regulations and the scarcity of fossil resources are causing a major technological modernization of the vehicle propulsion and transmission systems which Spanish companies will have to be able to keep up with in order to stay in the market.
- ✓ **Changes in society.** New concepts of comfort, ergonomics, connectivity, integration of social groups (the elderly, the disabled, children,...), pedestrian safety,...
- ✓ **Productive competition of new countries:** LCC (Low Cost Countries) and globalization of the industry.
- ✓ **Raising society's awareness.** Safety has become an essential requirement for the vehicle user and for society as a whole due to the high costs involved, both financially and in terms of human lives. The European Union's target of halving the number of accident victims by 2010 has presented manufacturers with the challenge of incorporating new technologies in all the phases of the accident: prevention systems, mitigation and post-accident service.
- ✓ **Sustainable transport.** The appropriate use of resources and the improvement of urban, inter-city and freight traffic are priority matters in all policies.

Another concern of the Sector and the global economy is the limited duration of fossil resources, on which practically all the

technology of this product is based. Research into alternative and less pollutant fuels is the gateway to the future through which Europe, and therefore Spain, must enter.

If we look at the investments of vehicle constructors in the coming years, it is clear that vehicle production is going to grow, especially in new markets or markets in which Spanish companies have less presence. It is therefore necessary to face up to this future and develop new strategies.

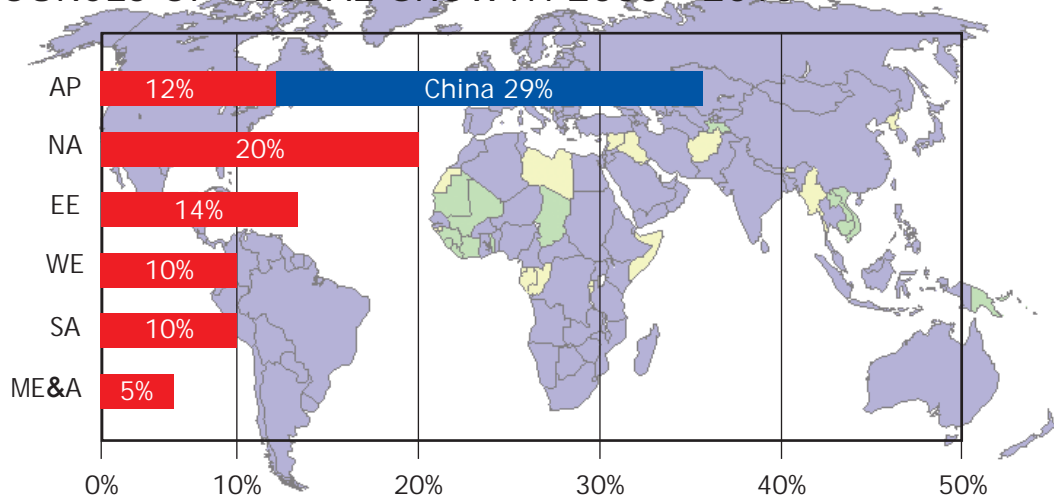
First and foremost, the Asia and Pacific region will account for 41% of this growth (particularly China, which alone will be responsible for nearly 30% of the total growth).



The second source of growth will be North America: with a current output of nearly 16 million units, North America will contribute 20% to the global increase in production, its output rising to nearly 18 million vehicles.

Finally, Eastern Europe will account for 14% of the global growth. These three areas will be responsible for three quarters of the Sector's growth until 2010.

SOURCES OF GLOBAL GROWTH 2003 - 2010



SERtec's strategic objectives, set by the most important Spanish organizations and reflected in this report, provide the necessary framework for being able to compete in the light of this new situation.

We need to consider the possible impact in two scenarios: doing nothing or, in another, taking advantage of the change by converting it into a strength, and given our Sector's proven capabilities, this is the way forward.

The members of the Platform will

continue to work together to face up to this future and develop new technologies.

The Spanish R&D system should provide the appropriate framework to enable automotive companies to take on these challenges, and therefore the Government must work in collaboration with companies, technology centres and universities in order to ensure adequate coordination. Only by coordinating efforts and taking the next steps together will it be possible to do this.

3. Technology Platform of Automotive Components - SERtec

At the end of March 2006, the Technology Platform of the Automotive Components Sector -SERtec- began to operate as a means of developing and monitoring initiatives among the different agents involved in the Sector's chain of innovation in Spain, in order to create a culture of innovation and a common course of action with the aim of increasing the competitiveness of automotive Sector companies in Spain in view of the new challenges they face, through research, development and innovation in products and processes.

Its management requires the integration of the various participating agents (companies, technology centres, public research institutions, universities), in such a way that involves all the possible agents with a view to achieving the objectives, always bearing in mind the goals set by Community and national authorities in relation to sustainability, improving energy efficiency and reducing emissions, developing new solutions that reduce accident rates, etc.

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SERNAUTO is the coordinator of the Platform, which has the following administrative structure:



The Environment, Energy and Resources working group focuses on matters relating to engines and propulsion systems and the reduction of emissions into the atmosphere. It also analyses fuels and how to improve their use in vehicles. Finally, it takes into account, together with the Design and Production Systems Group, the implications in the end-of-life cycles of the vehicles.

The Safety working group analyses aspects relating to primary, secondary and tertiary safety and, together with the Mobility Group, the connections with infrastructures and other vehicles, with a view to reducing accidents and minimising their consequences.

The R&D Management and Promotion working group is directly involved in matters relating to the use and direct application of R&D in the companies' day-to-day activities, as well as in the better management of basic and applied technological know-how.

The Mobility, Transport and Infrastructure working group deals with the links between all aspects of the new vehicle communication needs (comfort, information, etc.) and the implications for safety, together with the Safety working group. Aspects relating to infrastructures and technologies which link vehicle and road are also included in this group.

The Design and Production Systems working group analyses the implications of automotive product development, the use of new technologies and the necessary tools and organisation. It also deals with the issues of manufacturing, resources and organisation. Matters relating to materials and their implications in design and/or production are also included in this group.

4. The Sector's Priorities

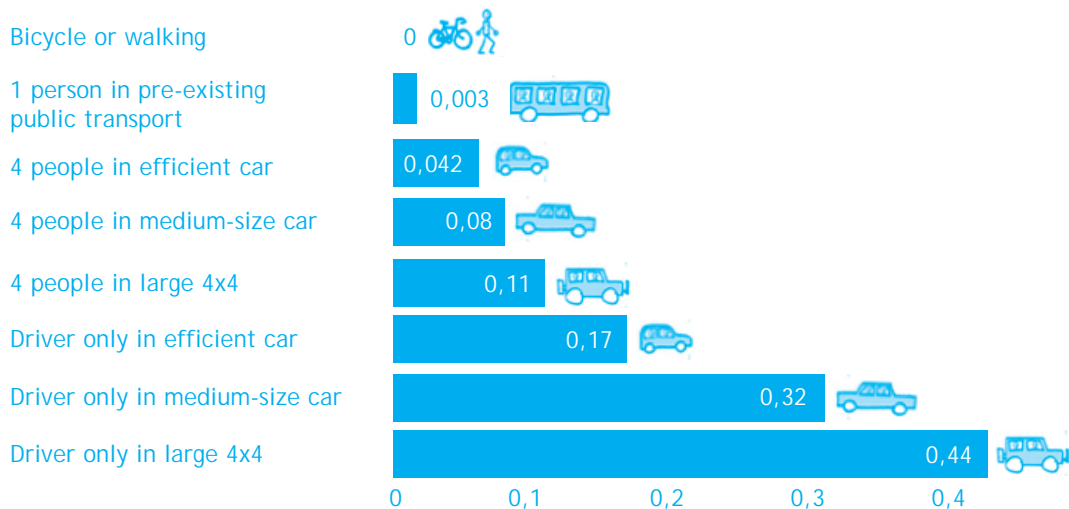
ENVIRONMENT, ENERGY AND RESOURCES PRIORITY

Society's growing environmental concern and awareness has led to limits being imposed on emissions (EURO 5 and EURO 6 for passenger cars and light duty commercial vehicles; EURO V and EURO VI for heavy duty vehicles) which are increasingly restrictive and difficult to achieve with modern vehicles. This, together with the increase in fuel prices throughout the world and the threat of dwindling fuel supplies, is the source of some concern regarding the future energy situation, all of which is contributing

to a renewed interest in the use of alternative fuels (natural fuel, biofuels and hydrogen) and propulsion systems (hybrid systems and fuel cells).

The global trend of increasing mobility stands in contradiction to greenhouse effect control criteria, local pollution and the exploitation of fuel resources. The sustainability of the transport sector will depend heavily on the introduction of technologies which reduce pollutant emissions and oil consumption.

EMISSIONS OF DIFFERENT MEANS OF TRANSPORT (kg CO₂ per person and kilometre)



The aim of the European Commission is to reduce the average carbon dioxide emissions of new vehicles to 140 grams per kilometre by 2008/2009, and to 120 g CO₂/km by 2010. The three main instruments for achieving this goal are: car industry commitments, labelling of vehicles and fiscal procedures.

Furthermore, all component manufacturers are affected by the new objectives relating to vehicle recyclability and elimination of prohibited/hazardous substances. All products designed for vehicles are undergoing innovations relating to materials, assembly and disassembly

processes, weight reduction, introduction of renewable resource materials in new components, elimination of heavy metals, etc. The objectives are to be achieved by the year 2015, but these products have to be manufactured before then, which represents a huge challenge in the medium term.

PRIORITIES

- ✓ Well-to-wheel analysis of the production and use of different fuels.
- ✓ Constructing emission inventory models and tools for predicting and understanding the impact of the implementation of new technologies.
- ✓ Developing information to ensure the client's acceptance of new technologies.
- ✓ New injection system designs and smaller engines.
- ✓ New concepts of combined ignition with new fuels.
- ✓ Improving components including batteries, control systems, light materials, low friction lubricants suited to the new ignition concepts.
- ✓ Advanced biofuels which offer greater reduction of greenhouse effect gases.
- ✓ Simplified designs and integration of hybrid components which reduce costs.
- ✓ Improving components including the energy storage system (batteries, ultracapacitors), control system, materials and electric engines.
- ✓ Intelligent systems which reduce energy consumption by means of assisted steering and improved traffic management.
- ✓ New designs of fuels cells which include high-temperature membranes, bipolar plates and air and humidity management systems.
- ✓ Hydrogen storage with the aim of improving costs and the performance of the fuel cell system.
- ✓ Developing ways of producing and distributing hydrogen with low costs and reduced greenhouse gas emissions.
- ✓ Developing low-cost and long-lasting advanced emission control systems.
- ✓ Developing nano-technologies with which to obtain more effective catalytic materials.
- ✓ Research into vehicle systems, including the engine, the exhaust pipe, transmissions, tyres and active noise control systems.
- ✓ Improved tools which incorporate environmental, recycling and waste reduction considerations into new designs.
- ✓ New materials, including composites, which permit the construction of lighter vehicles.
- ✓ New materials and improved techniques which include separation and dismantling processes, reversible assembly methods and logistics which facilitate recycling.

STRATEGIC ANALYSES

- Well-to-wheel analysis of the production and use of different fuels
- Constructing emission inventory models and tools for predicting and understanding the impact of the implementation of new technologies
- Developing information to the client's acceptance of new technologies

This set of objectives is regarded as the essential basis for evaluating the future impact of propulsion systems and fuels. However, the future implementation of the technologies and fuels is not determined by this factor alone. Other factors, such as cost, infrastructure, energy reserves, complementary technologies and supply potential, also have a decisive influence. In the future, it will be necessary to find the optimum vehicle-fuel combination according to the energy circumstances, the availability of infrastructure and the regulations applied in each region or country.

VEHICLES WITH EFFICIENT INTERNAL IGNITION ENGINE AND ADVANCED FUELS

- New injection system designs and smaller engines

Mixture formation systems require increasingly precise devices for a more efficient ignition, whereby consumption

and pollutant emissions are reduced. The stratified lean mixture in petrol engines represents a radical change of approach. Reducing the size of the engine also plays an essential role as far as consumption is concerned.

- New concepts of combined consumption with new fuels

The traditional concepts of homogeneous and heterogeneous ignition need to be adapted to the new engine-related requirements in order to improve performance and reduce pollutant emissions. HCCI (homogeneous charge compression ignition) produces a homogeneous mixture in the chamber which ignites at a constant temperature below 1550 °C, without any need for a spark plug.

- Improving components including batteries, control systems, light materials, low friction lubricants suited to the new ignition concepts

Reducing mechanical losses in internal combustion engines poses a major technological challenge, due to their negative impact on the engine's performance and power. Advanced electronic control of the engine requires optimised integration of different sensors and actuators, its quality and improvement of the performance of the power supply system (batteries).

- Advanced biofuels which offer greater reduction of greenhouse effect gases

Advanced biofuels with defined technical specifications equivalent to those of the fuel they replace in automotive engines. Biofuels from vegetable raw materials, through processes which result in greater reductions of greenhouse gases.

HYBRIDS AND INTELLIGENT ENERGY MANAGEMENT SYSTEMS

- Simplified designs and integration of hybrid components which reduce costs
- Improving components including the energy storage system (batteries, ultracondensers), control system, materials and electric engines

Electric vehicles are still not ready to conquer the automobile market. The main

reason lies in the batteries and their limitations; the energy supplied is simply not enough for long journeys. The hybrid vehicle combines the great autonomy of conventional vehicles and the environmental advantages of electric vehicles, resulting in a vehicle with lower consumption and fewer pollutant emissions. Its main disadvantage is the cost due to greater complexity, hence the need for simplified design and the integration of its components.

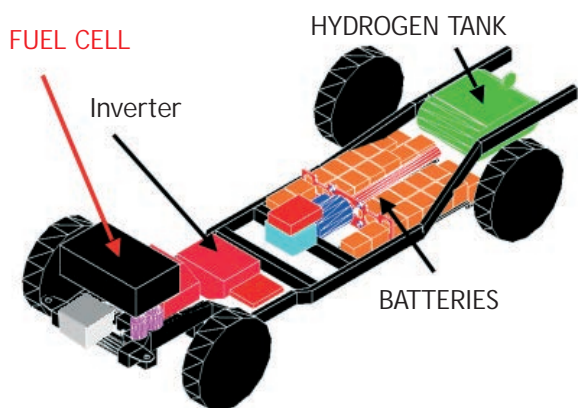
- Intelligent systems which reduce energy consumption by means of assisted steering and improved traffic management

The importance of this aspect stems from the fact that driving habits and traffic management have a significant influence on fuel consumption.

FUEL CELL VEHICLES AND LOW-CARBON FUELS

- New designs of fuel cells which include high-temperature membranes, bipolar plates and air and humidity management systems

The two types of fuel cell which are shaping up as the best candidates for application in motor vehicles are the polymer electrolyte cell (PEMFC) and the solid oxide cell (SOFC). The latter is an auxiliary power system, whereas the



former, the PEMFC, acts mainly as a drive system, but also as an auxiliary power system. The current interest in fuel cells is due to their high energy conversion capacity and clean (zero emissions at point of use) and silent functioning.

- Hydrogen storage with the aim of improving costs and the performance of the fuel cell system

The successful use of hydrogen as energy vector is closely linked to, among other things, the development of hydrogen storage capabilities. In this respect, the main challenges stem from applications in transport, where it is essential to be able to have stored hydrogen with high energy density.

- Developing ways of producing and distributing hydrogen with low costs and reduced greenhouse gas emissions

The use of renewable energies to obtain hydrogen is an extremely valuable technology due to its capacity to achieve the necessary output volumes by using clean energies, and because hydrogen can be used to store the generated energy, thereby helping to eliminate the intermittence of resources caused by the weather. The electricity produced by renewable sources could be used to segregate water via electrolysis and the hydrogen could be used

as an energy store. This would reduce the current operating costs of renewable energy plants, and they would be able to select the source of electricity according to the desired production capacity (small or large scale), on the basis of a distributed or centralized system.

LOW EMISSION VEHICLES

- Developing low-cost and long-lasting advanced emission control systems
- Developing nano-technologies with which to obtain more effective catalytic materials

This set of objectives encompasses the development of longer-lasting pollutant emission-reducing devices and the application of nano-technologies in the field of catalytic converters.

SILENT TRANSPORT SYSTEMS

- Research into vehicle systems including the engine, the exhaust pipe, transmissions, tyres and active noise control systems

The key priorities in this field are the reduction of sound emissions from the engine and the kinematic chain, including the tyres, and the development of active noise control systems.

SUSTAINABLE USE OF RESOURCES

- Improved tools which incorporate environmental, recycling and waste reduction considerations into new designs
- New materials, including composites, which permit the construction of lighter vehicles

- New materials and improved techniques which include separation and dismantling processes, reversible assembly methods and logistics which facilitate recycling

This set of objectives aims to promote the development of technologies and new materials which ensure a sustainable evolution of the self-propelled vehicle.

SAFETY PRIORITY

Coinciding with the EC initiative of reducing the number traffic accident victims, and in keeping with the eSafety initiative, the proposals for improving vehicle and traffic safety have been grouped together under two major strategies. The most important and direct strategy covers aspects which seek to mitigate and reduce

the impact which accidents have on people, while the other involves taking measures designed to prevent traffic accidents. A section relating to collective transport vehicles and special vehicles has been included due to their special characteristics, the wide range of people who use these vehicles and the large number of Spanish companies that make them.

It is worth pointing out that the objectives are prioritized in such a way as to highlight the aspects which the sector is expected to invest most heavily in over the next six years. Special importance has also been attached to the fact that there are Spanish companies or research groups capable of undertaking these developments. A very pragmatic effort has been made to avoid the inclusion of objectives which do not involve a Spanish participant. The following table is the result of this ordering of priorities.



The priorities can be summarised in the following sections:

1- Impact mitigation:

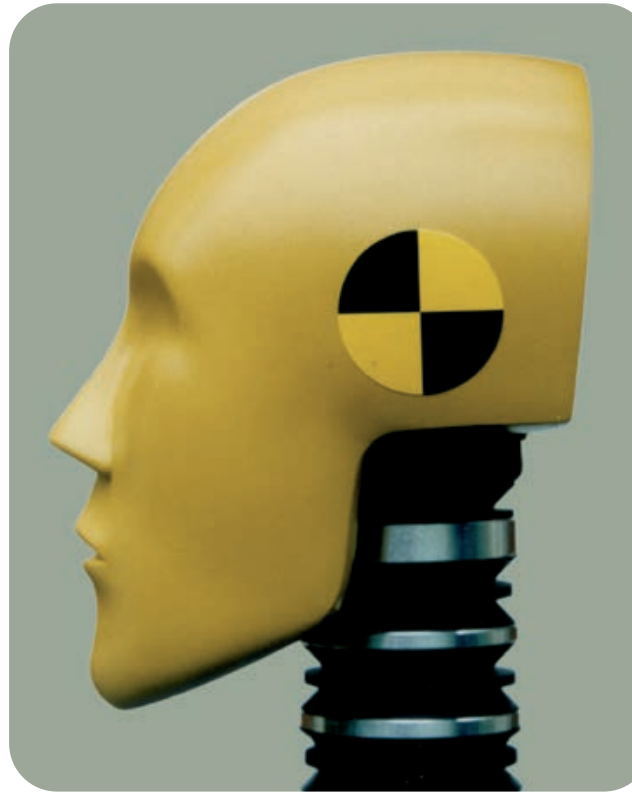
- a. Analysis of impact. Models
- b. Vehicle sensors, materials and technologies for mitigating the impact
- c. Protection of pedestrians and other vulnerable users

2- Prevention:

- a. Accidentology
- b. ADAS (Advanced Driver Assistance Systems)
- c. Special vehicles for transporting people, the disabled,...

3- Aspects shared with Mobility:

- a. Cooperative systems for improving efficiency, safety, infrastructure services and mobility in general
- b. E-call
- c. HMI (Human Machine Interface systems for communication with the driver)



PRIORITIES

- ✓ Pedestrians and cyclists. Safe fronts of active and passive vehicles.
- ✓ Biomechanics. Injury mechanisms, body impact limits, biomechanical databases.
- ✓ Models and virtual tests. Perfected human models and virtual tests.
- ✓ Developing impact dummies and their mathematical models, in accordance with gender and age characteristics.
- ✓ Side, rear and front impacts. Regulations, energy-absorbing structures.
- ✓ Detection before the collision and activation. Sensors, recognition of objects, including pedestrians, assisted braking.
- ✓ New materials. Multi-material composites, high-resistance materials; behaviour in the event of collision, assembly technology.
- ✓ Interior materials. New designs and intelligent retention systems.
- ✓ Automatic systems and accident reporting apparatus. Activating emergency services, precise information about accidents, localization of passengers, hazardous objects.
- ✓ Rescue procedures. Response scenarios, optimised cooperation, optimised navigation systems in rescue vehicles, blue corridor.
- ✓ Safety functions. Avoiding collisions, excessive speed warning devices, braking assistance, line control, adaptive lighting.

PRIORITIES

- ✓ Actuation and control. X-by-wire, chassis control.
- ✓ Sensors and recognition. Advanced distance/speed/position sensors, night vision and fog, image recognition, road conditions, topography.
- ✓ Monitoring of driving and the driver. Fatigue/health/alcohol detection systems, recording system. Systems and sensors for identifying occupants in the event of an accident.
- ✓ Communication between infrastructure and vehicle. Interoperativity, harmonization, warning systems, connection between vehicle and infrastructure.
- ✓ Cooperative traffic management. Improved transport efficiency, business models for vehicle manufacturers, road operators, service providers.
- ✓ Vehicle technology. Road/traffic/weather... conditions sensors.
- ✓ Infrastructure technology. Road/traffic/weather... conditions sensors, control and change of infrastructure.
- ✓ Accident analysis. Analysis of causality, understanding the phase prior to the accident, accident confirmation test, identifying the future development of needs.
- ✓ Accident investigation methodology. Connected databases, harmonization of data collection and statistical methods.
- ✓ Reconstruction methodologies. Advanced simulation tools, common methodologies, developing countermeasures.
- ✓ Sources of new data. Data collection, analysis and implementation in existing databases, EDR.
- ✓ Evaluating the efficiency of safety measures. Expected and observed efficiency, feedback to ensure improvement of systems.
- ✓ Adapted and integrated HMI. Interaction between the vehicle and the driver, integration of HMI apparatus.
- ✓ Tests for pre-legislative investigations.
- ✓ R&D activities for vehicles, devices and conditioning for transporting people with reduced mobility, including wheelchair users.
- ✓ Developing special vehicles for school transport, paying special attention to safety elements.
- ✓ Retention, comfort and occupant evacuation systems and load retention systems.
- ✓ Ergonomics and safety of the driver's post.
- ✓ Applying control technologies and telecommunications to feel operation, driving assistance and information for users.

MITIGATION OF IMPACTS OF TRAFFIC ACCIDENTS

Protection of vulnerable users

- Pedestrians and cyclists. Safe fronts of active and passive vehicles

Pedestrians have been identified as the most vulnerable public highway users. Given that the measures designed to improve pedestrian safety can also be adapted to cyclists, the latter have been included in the same group. The aim is to promote the development of both active and passive systems which, located on the front of the vehicles, reduce the injuries of people who are knocked down. Other points include references to other users who can be classified as vulnerable, such as children and the elderly.

Safety evaluation tools and procedures

- Biomechanics. Injury mechanisms, body impact limits, biomechanical databases
- Models and virtual tests. Perfected human models and virtual tests
- Developing impact dummies and their mathematical models, in accordance with gender and age characteristics

The aim of this group of specific objectives is to promote the development of know-how and both software and hardware tools which permit evaluation of the level of safety offered by vehicles. In

relation to these safety evaluation tools, the contribution of dummies is considered essential. Improving the biofidelity of these dummies and knowledge of the human body's response to impact situations will facilitate the development of more effective protection systems.

Architecture and compatibility between vehicles

- Side, rear and front impacts. Regulations. Energy-absorbing structures
- Detection before the collision and activation. Sensors, recognition of objects including pedestrians, braking assistance
- New materials. Multi-material composites, high-resistance materials; behaviour in the event of collision, assembly technologies

The most important aspects identified in this group of objectives are: side impact safety, possible architectures and sensors which detect and, insofar as possible, prevent collisions, and the development of new materials and assembly technologies which absorb more energy than traditional materials in impact situations.

Retention systems

The priority action in this group is the development of interior elements, systems, materials and designs which reduce the injuries of vehicle occupants in the event of front, rear and side collisions between vehicles.

Post-accidente

- Automatic systems and accident reporting apparatus. Activating emergency services, precise information about accidents, localization of passengers, hazardous objects
- Rescue procedures. Response scenarios, optimised cooperation, optimised navigation systems in rescue vehicles, blue corridor

Improving the attention given to accident victims by reducing assistance time has been proved to be a suitable policy for reducing the consequences in those affected.

Vehicle technologies

- Safety functions. Avoiding collisions, excess speed warning devices, braking assistance, lane control, adaptive lighting
- Actuation and control. X-by-wire, chassis controls
- Sensors and recognition. Advanced distance/speed/position sensors, night



vision and fog, image recognition, road conditions, topography

- Monitoring driving and the driver. Fatigue/health/alcohol detection systems, recording system. Systems and sensors for identifying occupants in the event of an accident

Vehicle technology objectives include developing new vehicle safety functions aimed at preventing collisions. To this end it is necessary to develop advanced sensors and systems which monitor the vehicle's environment and the actions and physical condition of the driver, thereby informing the driver or preparing the vehicle to ensure safer behaviour in the event of a collision.

Cooperative systems

- Communication between infrastructure and vehicle. Interoperability, harmonization, warning systems, connection between vehicle and infrastructure
- Cooperative traffic management. Improved transport efficiency, business models for vehicle manufacturers, road operators, service providers
- Vehicle technology. Road, traffic, weather... conditions sensors
- Infrastructure technology. Road, traffic, weather conditions sensors, control and change of infrastructure

A moving vehicle uses and shares the infrastructures with other vehicles. Improving

communication between vehicles and between vehicles and infrastructures can improve the information the driver receives about the condition of the roads and therefore enable the driver to take preventive measures which improve traffic safety.

PREVENTION OF TRAFFIC ACCIDENTS

Investigation of traffic accidents

- **Accident analysis.** Analysis of causality, understanding the phase prior to the accident, accident confirmation test, identifying the future development of needs
- **Accident investigation methodology.** Connected databases, harmonization of data collection and statistical methods
- **Reconstruction methodologies.** Advanced simulation tools, common methodologies, developing countermeasures
- **Sources of new data.** Data collection, analysis and implementation in existing databases, EDR
- **Evaluating the efficiency of safety measures.** Expected and observed efficiency, feedback to ensure improvement of systems

The investigation of traffic accidents allows us to identify and understand what happens on public highways, providing researchers and public authorities with the information they need to devise road safety improvement policies.

Human factors

- **Adapted and integrated HMI.** Interaction between vehicle and driver, integration of HMI apparatus

The systems installed in the vehicle should communicate with the driver in such a way that the driver's attention to traffic requirements is not reduced. It is necessary, therefore, to develop systems which evaluate the workload level and the extent to which the driver's attention is reduced when he interacts with the vehicle's systems, and to design systems which require as little attention as possible on the part of the users.

COLLECTIVE PASSENGER TRANSPORT VEHICLES AND SPECIAL VEHICLES

- Tests for pre-legislative research
- R&D activities for vehicles, devices and conditioning for transporting people with reduced mobility, including wheelchair users
- Developing special vehicles for school transport, paying special attention to safety elements
- Retention, comfort and occupant evacuation systems and load retention systems
- Ergonomics and safety of the driver's post
- Applying control technologies and telecommunications to fleet operation, driving assistance and information for users

The use of collective transport vehicles considerably increases the capacity of public highways. Improving the safety and comfort of these vehicles is a key factor for encouraging more people to use them. To this end it is necessary to make an

effort to develop regulatory requirements adapted to their special characteristics, bearing in mind the safety, comfort and accessibility of all their users (mainly children, people with reduced mobility and the elderly).

DESIGN AND PRODUCTION SYSTEMS PRIORITY

Companies have shown a great deal of interest in the aspects relating to design and manufacturing as a direct consequence of the importance attached to them in the present structure of the Sector, which is markedly production-oriented. Lines of research and short, medium and long-term needs have been established in the related group of priorities, thus including the whole temporary spectrum.

The new international scene is one of the factors which have marked interests and needs of the companies. In this new situation, there is a high pressure at two levels. On the one hand, the appearance of new agents and companies unknown up to date, who enter the market with great force, distorting the concepts used up until now. On the other, the manufacturers' interest in exporting their own globalisation models, forcing suppliers to

take on new challenges and risks (internationalization), mainly from the manufacturing point of view.

In this respect, the formation of international groups and companies with high added value in product and/or process is a key element to face the needed evolution. These groups should take advantage of the current situation and the companies' know-how in terms of design, production technologies and end product quality.

The working group has specifically assessed the importance of the materials in the final product, knowledge thereof, their application in new products and their implications in manufacturing processes. These aspects relating to materials research have a cross-cutting effect on both the design priorities and the manufacturing priorities.

PRIORITIES

DESIGN

- ✓ Product concept
- ✓ Design process
- ✓ Process and support tools
- ✓ Training
- ✓ Sustainability

PRODUCCIÓN AND RECYCLING

- ✓ New production line concepts
- ✓ User-friendly production systems
- ✓ Product remanufacturing
- ✓ Manufacturing execution systems
- ✓ External Logistics

MATERIALS

DESIGN

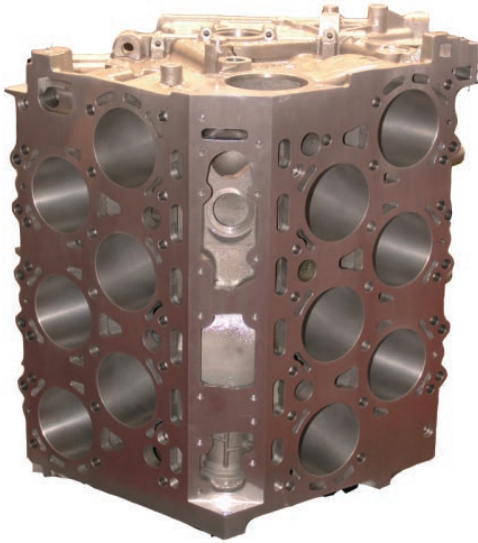
1. Product concept

The shift from a new concept to a final product which involves a position of control in the market is an aspect of vital importance that demands a higher design development and the definition of the manufacturing process. In this field the following points to be developed, are observed:

Functional analysis and specification

- Systematization of product design analysis
- Utilization of good practice guides
- Focus on customer and requirements





- Need for training in product design
- Application of techniques such as QWFD, HOQ and/or use of “customer’s voice”, which reduce modifications and boost the creation of attributes in the new products

Analysis of product-process feasibility

Correct use of tools for analysis. They need to be used within the simultaneous engineering team, and not only within the R&D projects.

Utilization of new concepts:

- **Innovation.** Proposing specific sectoral programmes to standardize and generalize the management of innovation and R&D and innovation projects
- **Creativity.** Utilization of creativity techniques

New technologies and processes

- Know-how, acquisition and incorporation in the product of new technologies and concepts that may improve the final functionality
- Technology Watch. It is necessary to have a shared and freely accessible information centre which provides detailed information about new technologies, their current uses and their possible future courses of development

New materials. Know-how, acquisition and incorporation in the product:

- Developing new materials on the basis of the need for special performance features
- Technology Watch. It would be very helpful to have a shared and freely accessible information centre which provides detailed information about new materials, their current uses and their possible future courses of development

Cross-cutting trends

- Products with greater “intelligence”
- Miniaturization (microtechnologies / nanotechnologies)
- Technology Watch

Product modularization

Standardization of modules by functions and by dimensions, with greater specialization in the function of the product to be designed.

Value analysis

Value analysis tools with initial project phase application, with non-closed design.

Safety

- Safety concepts in the initial design phase
- Technology Watch

Environment / Recyclability

- Product design, considering environmental impact and Kyoto impact according to various applicable criteria (e.g. CO₂ emissions per unit of measurement) both in product and in production
- Technology Watch. Updated control and shared and freely accessible information centre which provides detailed information about the effect on environment of the new materials, as well as their possible future applications.

2. Design process

Even greater implementation of CAD/CAM systems is necessary, as well as the intensive use of the models generated with the corresponding tools and virtual prototyping (simulation), including accessibility and implementation of simulation tools.

As support to this process, rapid prototyping technologies also acquire great importance (dimensional, conceptual, functional, manufacturing prototyping).

In connection with prototypes, the development and implementation of adapted

and specific tests must permit and improve product validation in the early stage of development.

3. Processes and support tools

Developing, managing and using tools for integral management of the product and its development, using the concurrent engineering concepts in the product / process supply chain.

4. Training

New continual training models. Creating and identifying key process specialists. Training-related matters extend to all parts of the design and production systems.

5. Sustainability

Applying sustainability concepts in all the initial design phases. In this way, product management throughout the life cycle will be improved, including disassembly, reuse and valorisation of waste.

PRODUCTION AND RECYCLING

6. New production line concepts

The development of all aspects of the virtual factory, together with prior simulation of the processes, should help reduce commissioning problems and therefore improve the installation profitability.

There is a great need to develop the flexibility and modularity of the installation by means of:

- High productivity lines

- Interchangeable manufacturing modules
- Catalogue change standardization

Investment in high-speed production machines, machine architectures with open controls, rapid tooling and KBE/KBS systems requires development in the general concept of automation. Productivity will also be increased by developing and implementing teleservice tools, telemaintenance and machine and equipment functioning diagnosis.

7. User-friendly production systems

Analysis of production related issues and their environmental implications are fundamental aspects and thus priorities focus on three areas:

Environment. It is necessary to improve efficiency in the use of resources, reusing sub-products (waste from other processes) and establishing material cycle closure (circular economy). Furthermore, the design of means of production must include the Kyoto / CO₂ concepts (reduction of environmental impact).

Interfaces / ergonomics. Improving productive systems is directly related to the development of user-friendly interfaces and work station designs which do not affect the occupational health of employees.

Elimination, minimization and management of waste. New research fields open in the productive processes of the future, through new recycling technologies

and by using improved material reuse systems, including new waste/sub-product valorisation processes. Environmental, social and economic aspects (convenience indicators) should be born in mind.

8. Product remanufacturing

Clear regulations are required for the application of the product remanufacturing concepts that will affect their incorporation into new product use cycles.

9. Manufacturing execution systems and tools (MES)

Management of manufacturing systems is fundamental for organising rapid responses with contained costs in the event of contingencies. The activity focuses on the following areas:

- Rapid planning and re-planning of production in the event of contingencies, changes or problems, with adequate tools and constant updating of the in-plant situation and processing of information in real time



- Effective management of maintenance of means production to achieve higher rates of utilization and profitability
- Active quality control, which should permit, at a reasonable cost, assurance of the process and control of the delivered end product. This point is extremely important given the possible repercussions with regard to the customer
- Supply systems and internal logistics. An adequate management of supplies in plant, supplying of working posts and reduction of handling cost will increase the productivity and profitability of the installations.

Production management training for employees is a key issue which affects all the previous points and to which a capital importance is given.

10. External logistics

The impact of logistics in the current process, the distancing and distribution of the customer's production plants in relation to procurement of raw material, distribution of the finished product and management of

fleets and warehouses together with the associated cost, justifies the priority of developing improvement solutions.

MATERIALS

In relation to implications and needs regarding knowledge and use of materials in design and production processes, priority has been given to the following lines of development and application over the next few years:

11. New metallic materials (especially for high performance), plastic materials and composites, as well as ceramic materials. Research into associated and optimised processes for each type of material is considered to be extremely important.

12. New assembly and disassembly systems (welds, adhesive, mechanical), with implications in the life cycle of products and with special attention to reuse and final valorization.

13. Developing and applying coatings and treatments to improve durability in more demanding working conditions.

14. Materials for new functions (energy absorption, impact, acoustic, thermal, electromagnetic, particle retention) and high-performance functions (inflammability, toxicity, recyclability, heat).

15. Applications and development of light materials, nanomaterials and fabrics.



MOBILITY, TRANSPORT AND INFRASTRUCTURE PRIORITY

Within the mobility and transport concepts, one of the objectives for the manufacturers of vehicles and their components is the development of new products adapted to the new market needs:

- Low-cost vehicles,
- Vehicles for elderly people
- Hybrid vehicles as a stepping stone towards completely electric vehicles.

Even though these new products are being developed beyond our borders, the national automotive suppliers should offer products and innovative technologies applicable to these new vehicles.

Another objective within this concept is the reduction of traffic congestion and its repercussions on people's quality of life, as well as an improvement of the environmental impact (reduction of fuel consumption and emissions). This objective must be a priority for all public policies in European countries, and therefore these research lines represent an opportunity not only to make technological progress, but also to meet society's needs.

When defining the medium and long term research lines, it is necessary to integrate solutions focused not only on the increase of the technological capacity, but also on the

political determination to implement certain mobility management models and make the necessary investments in infrastructures and public transport so that these objectives can be achieved.

New vehicle concepts are now a basic line for car manufacturers, and they are currently "renewing" their approach to vehicle services and the design of vehicle components in what is a commercially burgeoning market niche.

It is important to take advantage of Spanish leadership in areas such as infrastructure in order to carry out research aimed at improving V2V (Vehicle to Vehicle) and V2I (Vehicle to Infrastructures) communications, as well as new services aimed at vehicle users and passengers. Leading telecommunications and infrastructure companies, together with the introduction of non-traditional automotive technologies, could provide the key to making improvements in this field.



PRIORITIES

- ✓ Improving and expanding public transport (other agents, principally Public Authorities)
- ✓ Communication and information systems
- ✓ Demonstrators in field tests. Field Operational Tests (FOTs)
- ✓ New components for hybrid vehicles
- ✓ HMI. Human Machine Interface. Mobility Systems
- ✓ Studies of socio-economic trends
- ✓ Cooperative systems. Homologation/legislation regarding these solutions
- ✓ Evaluation of models for quality and reduced cost
- ✓ Concepts of special vehicles and/or vehicles for reduced mobility mass-produced
- ✓ Components for low-cost vehicles and for new vehicle concepts

PUBLIC TRANSPORT

- Improving and expanding public transport (other agents, principally Public Authorities)

Any policy designed to improve mobility involves strengthening public transport by incorporating innovations which contribute to better fleet management, developing intermodality and providing clean and effective public transport services. To this end, it is essential to develop interrelationships between the public authorities (local, regional and national) responsible for determining the main courses of action and the industry, in order to find innovative solutions which help achieve this objective.

NEW VEHICLE CONCEPTS

- New components for hybrid vehicles

The development of new propulsion concepts in hybrid vehicles will require an integrated vision of the vehicle, as well as the development of new components which as yet do not exist in the Sector. To this end, it will be necessary to develop new components such as electronic devices and power distribution boxes, electrical machines, fuel cells, etc, which will provide the basis for subsequent developments of completely electric vehicles.

- Demonstrators in field tests. Field Operational Tests (FOTs)

The validation of new mobility solutions demands to carry out field tests on a large scale with large fleets in different places (including between countries), and to this end Field Operational Tests (FOTs) are a priority in the 7th EU Framework Programme . In Spain, an effort should be made to promote the inclusion of these lines of work in the national R&D and innovation programmes, since they are not

included at present. These field operational tests (FOTs), when properly used, constitute a basic tool when it comes to implementing possible solutions and observing their actual impact on mobility.

- **Concepts of special vehicles and/or vehicles for reduced mobility mass-produced**

There is great scope for developing not only limited-production special vehicles for the disabled, but also mass-produced vehicles aimed at, for example, people over the age of 60 with purchasing power but reduced mobility who demand a vehicle with different features, and which will be mass produced.

- **Components for low-cost vehicles and for new vehicle concepts**

The capacity to offer solutions to the constructor adapted for these types of vehicles, which currently constitute one of the principal lines of most manufacturers, could provide many suppliers with a new niche.

These last 3 points share a problem in that the concepts will not originate in Spain, since the vehicle constructors have their R&D centres abroad. Nevertheless, these concepts are of great interest to the Sector because they need to be very closely monitored so that components/solutions which help to manufacture these vehicles can be developed in Spain.



SOCIO-ECONOMIC TRENDS

- Studies of socio-economic trends

Work in this area seeks to gain a clearer understanding of the decisions people make and how their behaviour changes over time and according to where they come from. The studies should detect how economic changes and populations modify mobility and accessibility needs. They will also analyse the effects of these changes on the population pyramid, with different mobility and needs which directly affect users and transport infrastructures according to their geographical location.

- Evaluation of models for quality and reduced cost

Analytical studies to find better transport systems for their users, the most important parameters being quality (comfort, punctuality, timetable, etc) and the impact of the costs involved.

MOBILITY SYSTEMS

- HMI. Human Machine Interface

Studies to facilitate and improve vehicle-driver interaction, especially to ensure efficient, reliable and effective use. This requires developing new voice, touch, vision, etc concepts and control technologies.

COMMUNICATION AND INFORMATION SYSTEMS

- Cooperative systems. Homologation/legislation regarding these solutions

Cooperative systems are those which use V2V (Vehicle to Vehicle) and V2I (Vehicle to Infrastructures) technologies to improve both the management and safety of road transport mobility by dealing with or preventing traffic jams and accidents.

- DATA COLLECTION

1. Harmonization of methods
2. Information in real time for traffic management. Forecast tools

Research and studies in these fields will improve analysis for optimisation in planning the necessary investments in national infrastructures, in order to be able to meet the needs of users in different geographical regions.

- PROVIDING INFORMATION

3. Travel information
4. Multimodal information service for different groups of users

Intelligent transport systems depend on the reliability of the information provided and on the information given for an optimisation of multimodality.

- INFORMATION TECHNOLOGIES

5. Harmonization
6. Multi-channel solutions

These aspects are essential for being able to integrate both the traffic management and the safety systems, and it is necessary to create a vehicle architecture where these systems function.

R&D MANAGEMENT AND PROMOTION PRIORITY

Some of the special features of the Sector become even clearer in this group's work, and they are summarised below in three different spheres:

Spain:

- Need to increase competitiveness in order to improve the position of Spanish companies in the market
- Delocalization problems
- Considerable importance of the components industry
- Individual research, little culture of collaboration
- Insufficient company leadership in R&D

Europe:

- Lisbon Summit (year 2000), objective: Europe, the most competitive economy in 2010

- Development of the 7th Framework Programme

Global:

- Environmental needs
- Sustainability
- Globalized environment

The objectives which the group has set itself in keeping with this scenario are divided into four areas of action:

R&D and Innovation Promotion Policies

Promoting the innovation culture in the companies, including the different initiatives in all spheres of the sector: from the academic sphere to the business sphere, including direct aid for R&D and innovation through the EU Framework Programmes, National R&D programmes or similar initiatives at the regional level. Other aid and promotion formulas are analysed and disseminated, such as tax incentives for R&D and innovation, either from own initiatives as well as those promoted in other countries around us.

Training Needs

Analysis of the Sector's training needs at all levels: training of engineers, training in the field of project and other initiative management or training of operatives. Initiatives that may solve the key questions of our Sector and studied and promoted: Is the training offered at present sufficient? Are



extra courses in addition to those currently offered necessary / recommendable? Can the performance of operatives be improved by means of selective training processes? Can competitiveness of our companies and of our personnel be improved through students training in European companies?

Forecasts and Technology Watch

Relevant and useful information for the main agents involved in the Sector. Forecasts and technology watch allow companies to position themselves in innovative areas with strong potential for implementation in the future.

The Sector's information needs are also analysed. These information needs may range from the abovementioned forecasts to forthcoming regulations or legislation currently in force. Information that could come from the analysis of the sector's indicators is also considered, which are included in different information barometers, such as the technological positioning barometer, the aptitudes for innovations barometer or the attitude to innovation barometer.

"Who's who" and "who does what".
Sector agents. Analysis of capabilities.
Matching supply and demand.
Internationalization

Identifying all the agents involved in the Automotive Sector, together with their specific capabilities. The agents are divided into the following groups:

- Public Authorities
- Technology Centres
- Universities
- Research Centres
- Industry: systems, components, modules and applications

Once the main agents and their different capabilities have been identified, the possibility of matching the technological supply of the centres and universities with the research demand of the companies is analysed, in order to ensure that the research carried out meets the actual research needs.

With regard to internationalization, countries or regions with significant growth prospects are analysed:

- Asia and Pacific
- North America
- Eastern Europe

Finally, the specific subjects dealt with by this "R&D Management and Promotion" working group can be grouped together in two main areas:

- Promotion of R&D and innovation in the Sector
- Promotion of R&D and innovation management in companies

PRIORITIES

- ✓ Identifying/Developing easy access portal and professional agreement for members, based on technological references Map. Option in English as origin of search
- ✓ Determining specific automotive training:
 - Experts with specialist knowledge of generic Sector methodologies
 - Value analysis
 - Rapid tooling & prototyping
 - Virtual simulation of production
 - Assembly/Disassembly
 - Collaborative Product and Process Design
- R&D Activities
 - Need to retrain experienced personnel for R&D activities
 - Need for R&D project managers; collaborative vision; consortiums
 - Promoting student mobility and exchange of professionals between universities, centres and companies. Establishing strategic training policies
- ✓ Promoting participation of the Components Sector in both national and international cooperation projects, and in other international collaborative research and development programmes
- ✓ Institutions-companies/areas map
- ✓ Matching supply and demand
- ✓ Involving OEMs (grant holders and work experience at their Development Centres)
- ✓ Setting up centres of excellence linked to the R&D activities of parent companies (specific competencies and niche products). We insist on the importance of maintaining developments in Spain and the importance of establishing multinationals here
- ✓ Joint expeditions of the TCs

FORECASTS AND TECHNOLOGY WATCH

- Identifying/Developing easy access portal and preferential agreement for members, based on Map of Technological References. Option in English as origin of search

Through the Platform or SERNAUTO, the tool will be updated and alive so that it fulfils its intended purpose.

• Matching supply and demand

Information systems: 2 portals available

1. Sector news and information SERNAUTO
2. Map of References/Supply-Demand FITSA

Impulse systems:

1. Unit of International Innovation
2. Working Groups

TRAINING NEEDS

- Determining specific automotive training:

Experts with specialist knowledge of generic Sector methodologies

- Value analysis
- Rapid tooling & prototyping
- Virtual simulation of production
- Assembly/Disassembly
- Collaborative Product and Process Design

R&D activities

- Need to retain experienced personnel for R&D activities
- Need for R&D project managers; collaborative vision; consortiums
- Promoting student mobility and exchange of professionals between universities, centres and companies, including international programmes and agreements. Establishing strategic training policies. Encouraging mobility

An in-depth study of the automotive and project management training currently provided is required in order to assess whether it coincides with the demand of professionals and the needs of the industry, and what design should be proposed where appropriate.

Specific lines of support are required for training geared towards R&D departments (Ministry of Education: medium and long-term plan and coordination of universities).

Promoting existing grants for research personnel.



There are no career prospects in R&D:
Lack of stable employment.

The grant system is too widespread.

Priority should be given to the specific lines of support for training personnel in R&D, both in management and in specialities.



- Involving OEMs (grant holders and work experience at their Development Centres)

Proposing ideas about the grant system, since there is no specific legislation about employing grant holders and it is a good time to establish regulations.

R&D AND INNOVATION PROMOTION POLICIES

- Promoting the participation of the Components Sector in CENIT (national large projects) and other international collaborative research and development programmes

SERNAUTO's INTERNATIONAL INNOVATION UNIT will inform and advise of the importance of participating in CENIT and other international collaborative development programmes. Collaboration between companies is promoted on the basis of the supply and demand knowledge or

through common interests.

- Promoting the self evaluation of R&D in the companies and proposing initiatives to systematize the innovation management activities
- Setting up centres of excellence linked to the R&D activity of parent companies (specific competencies and niche products)

Business Technology Centres

There is a need to simplify grants, avoid duplication of resources, coordinate initiatives, funding issues (risk capital, promoting SMEs,...). The OECD advises Spain to improve the coordination of its R&D system by developing a greater capacity for strategic planning and evaluation.

WHO DOES WHAT. INTERNATIONALIZATION

- Map of institutions-companies/areas

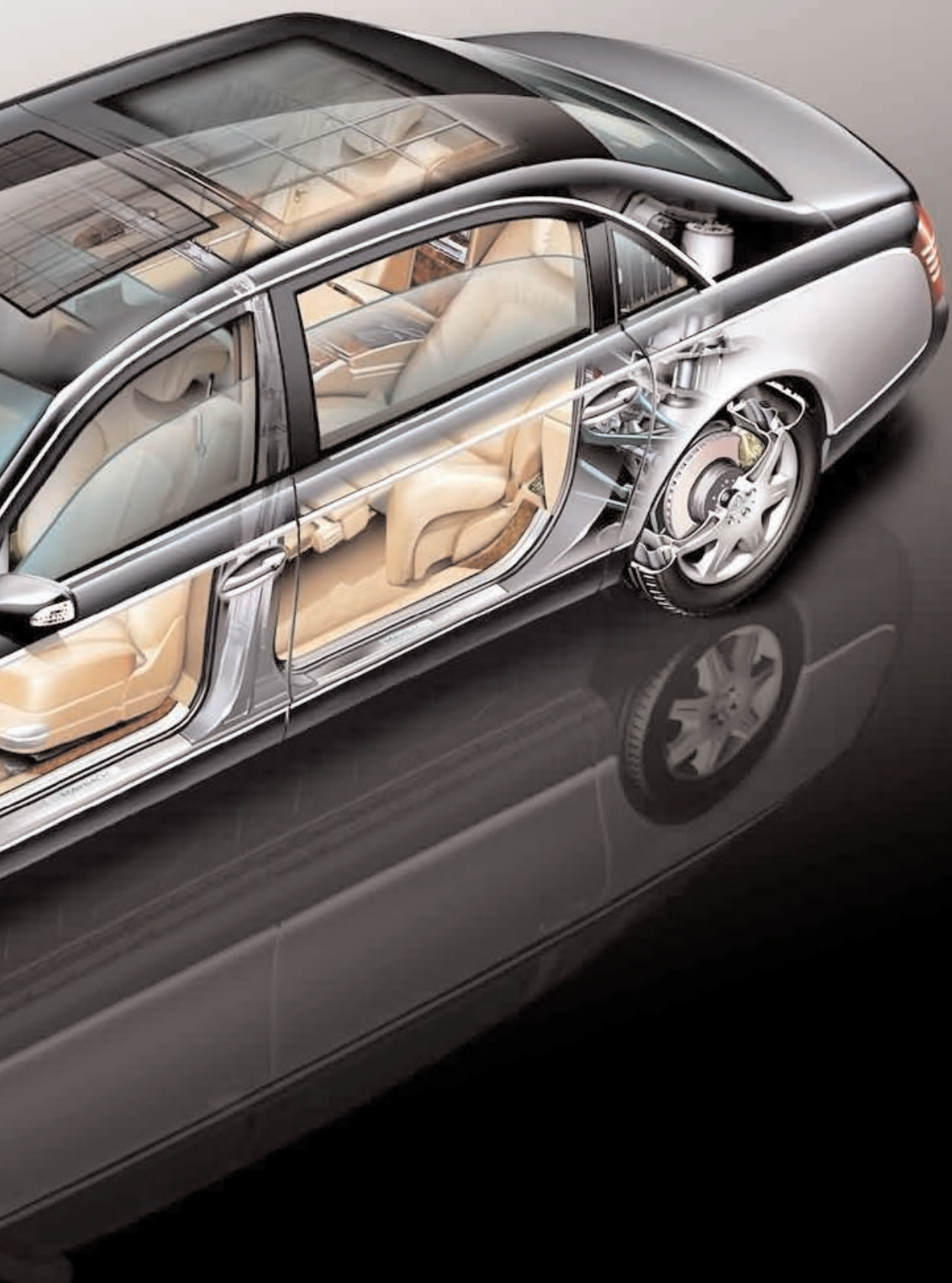
The information should be available at the European Association which encompasses all the technology centres, EARPA, and at CLEPA, the European Association of Component Manufacturers.

- Joint expeditions of the TCs.

SERNAUTO in coordination with the Technology Internationalization Plan of the Foreign Trade Agency (ICEX) intends to reinforce Spain's international image -and the image of "made in Spain"- in the industrial and technological sphere.







SERtec ACTIVITIES 2006-2008

With the establishment of European platforms, at the request of the European Commission, and at the start of aid to networks from the former Ministry of Education and Science, SERNAUTO, through its R&D Committee, proposed organising the Spanish mirror group of ERTRAC.

Following several contacts and by analysing the national reality, it was decided to adapt the structure of this platform to the conditions of our industry. This is why the Spanish Platform, unlike the European one, has focussed on component suppliers, since the clients, the car makers, do not have any decision centres in Spain and all the R&D effort is made outside Spain. They were nevertheless invited to the presentation day as a means of providing information about the great R&D effort being made by Spanish suppliers in order to carry out projects for their clients and to establish their strategies.

The SERtec structure is equivalent to the original ERTRAC one since it has the same four working groups, adding one for R&D management and promotion, and the same working policies, although adapted and prioritised according to Spanish capacities. Its activity as promoters of the initiative is therefore centred on the Automotive Components Industry, but it also includes all operating applications and possibilities needed to comply with the aims set out for surface transport. The subjects of energy,

logistics or intermodality, amongst others, are covered by new members joining, giving the open character of the Platform, and the coordination with other related STPs (Spanish Technological Platforms).

Of the activities carried out by SERtec in the 2006-2008 period, the following should be highlighted:

- **Presentation Day at the Ministry of Industry, Tourism and Trade, 29 March 2006**

This was attended by companies and technological centres that play a major role in developing innovative company strategies, research units at universities that wish to work together with our industry and Regional Governments and public institutions that have an essential role in policies to promote and improve R&I and innovation in Spain.

Manuel Montes, Assistant Director-General for Schemes to Promote Technical Research in the industry from the Ministry of Education and Science, presented the events

The Platform promoters subsequently carried out presentations: Jose Esmoris, Chairman of the R&D Committee at SERNAUTO and Technical Manager of Cie Automotive; Francisco Aparicio, Manager of INSIA-UPM; Iñaki Inzunza, Tecnalia Automoción Manager and Montserrat Escudero, General Secretary of SERNAUTO.

Jose Manuel Pedrero of Robotiker-Tecnalia and Jose M^a López of INSIA-UPM presented the aims, actions, organisation and working groups.

The presentation was closed by Jesús Candil, Director General of Industrial Development from the Ministry of Industry, Tourism and Trade.

- 1st Plenary Meeting at Robotiker-Tecnalia (Zamudio), 26 September 2006

65 people belonging to companies, technological centres and universities, as well as some representatives of national and regional authorities met for a whole day to advance and structure the 2020 Strategic Plan for the Industry.

It was opened by José Antonio Jiménez Saceda, Director General of SERNAUTO and Chairman of the FITSA Foundation who gave a short explanation about the evolution of the Platform to date following its presentation at the Ministry of Industry, Tourism and Trade and about its internal organisation.

José Esmorís, Technical Manager of Cie Automotive and Chairman of the R&D Committee at SERNAUTO, recalled the main aims of the Platform and, as Chairman of the Environme Working Group, summarised the document that would later be expanded on in the workshops.

Working groups are chaired by:

1. Environment, Energy and Resources. José Esmorís - CIE AUTOMOTIVE
2. Safety. José M^a Tarragó - FICOSA
3. Design and Production Systems. Pedro Mari Vega - GESTAMP
4. Mobility, Transport and Infrastructure. Jordi Mestre - LEAR
5. Managing and promoting R&D and innovation. Vicente Sala - FAURECIA

Following the parallel workshops, each Chairman summarised the conclusions in the plenary meeting and set out the agenda for future meetings.

- Participation in ETRAC Workshop, "Sustainable Road Transport in Europe - move from Strategic Research Agenda to Roadmap", 5-6 December 2006
- WG1, WG2, WG4 and WG5 working meetings to establish the priorities of the Strategic Plan

- 11 January, meeting of the Environment, Energy and Resources Working Group held at INSIA facilities
- 16 January, meeting of the Managing and Promoting R&D and innovation Working Group at SERNAUTO offices
- 23 January, meeting of the Safety, Mobility, Transport and Infrastructure Working Groups to coordinate the conclusions of both groups, at Ficos International

- Creation of website: www.plataformasertec.es

- Participation in the Information Day about the First FP7 Call for Proposals in the area of Surface Transport organised by the CDTI (Industrial Technological Development Centre 16 February 2007

The SERtec Platform was invited to help in organising the above, attended by around 140 participants and with the automotive industry being the most widely represented (71 participants).

It was the representatives of the national platforms, together with Jesús Monclús of the CDTI, who were in charge of welcoming those attending and here Montserrat Escudero, Secretary General of SERNAUTO, as coordinator of the SERtec Platform, gave a view of Spanish Industry as the reason for the formation of a components industry platform.

Taking part in the road transport workshop were Bjorn Hedlund (ERTRAC), Jose M^a Tarragó (SERtec) and Miguel González (CEDEX - Ministry for Public Works), who acted as moderator. Bjorn Hedlund, CLEPA R+D Manager and from the ERTRAC Design and Production Group gave a short explanation about CLEPA and how ERTRAC works, leaving the way open for future cooperation with SERtec, and Jose M^a Tarragó for his part, Vice-president of Ficosa International, gave complete information about the priority areas in which the different Automotive Component Platform Working Groups are involved.

- Participation in the 1st Coordination Meeting of STPs relating to the National 2008-2011 R&D and innovation Plan organised by the

Ministry of Education and Science, 20 March 2007

The aim of this was coordinate and analyse any items of common interest for all platforms.

There was a great attendance and the following were invited to participate in the discussion groups:

1. Sustainable Chemistry STP
2. Automotive Components STP (SERtec)
3. Manufacturing STP
4. Hydrogen and Fuel Cell STP
5. Audiovisual Internet Technologies STP (e-NEM)

The choice of 5 speaker platforms marked their distinct character from the 30 existing ones in Spain, demonstrated in their origin, working, influence, leadership, etc.

An example of this is the SERtec Platform. Given the nature of Spanish Industry and faced with a lack of decision making power at most industry manufacturing plants installed in Spain, it is not possible to commence a project together with manufacturers (as occurs at ERTRAC), which means the equipment and components industry has had to take on this initiative.

- WG3 materials meeting, 28 March 2007
- 2nd Plenary Meeting at the Ministry of Education and Science, 25 April 2007

The draft was presented of the Strategic Technological Plan for the Automotive Components Industry (Vision 2020). This document is the fruit of the work carried out in the course of this year, in which the WGs have in their various meetings established R&D and innovation priorities for the Industry in Spain, emphasising those areas that are strategic, either due to the existing capacity, the potential of companies developing R&D in our country or the technological challenge they present for the vehicle, and they do, therefore, offer opportunities to companies, centres and universities so that they can be present in vehicles in the next few decades.

Amongst the forthcoming actions, the following should be highlighted:

- Review, design and diffusion of the STP
- WG meeting organisation aimed at pooling projects around priorities
- Coordination with other platforms
- Establishing indicators for monitoring targets
- [Participation at the Tecnoscopia '07 World - Café](#)
- [Participation at the 2nd STP Coordination Meeting with respect to the 2008-2011 National R&D and innovation Plan organised by the Ministry of Education and Science, 18 June 2007](#)

Once the Industry reference terms had

been provided for preparation of the new National Plan and in response to the undertaking made by the Secretary General for Scientific and Technological Policy in the coordination meeting of the Spanish Technological Platform held on 20 March, 2007, an information meeting was held at the Ministry of Industry, Tourism and Trade on the evolution of the process for preparation of the new National R&D and innovation Plan.

- [Workshop- Analysis and suggestions to the 7FP working programme draft. 2nd call for Proposals on Surface Transport, 6 September 2007](#)

The Chairmen and Secretaries of SERtec, representing the Plenary, met with Jesús Monclús at the SERNAUTO offices - CDTI, Delegate on the 7FP Transport (including Aviation) Management Committee to analyse the contents of the draft working programme for the 2nd call on Surface Transport in the



7PM. The aim was to compile all Information possible to be able to prepare the 3rd Plenary Meeting, where any bodies interested can start preparing projects and consortia as soon as possible.

- STP coordination meeting organised by the Railway Technological Platform (RTP), 18 September 2007

The first meeting of the National Technological Platforms was held at the initiative of the Railway STP, and in which SERtec took part.

The Executive Committee of the RTP considered it important to increase coordination and relations with other stakeholders involved in preparing strategic R&D schedules that may be, more or less, directly related to the Railway Industry. This is why they made contact with any technological platform that covers any aspect related to the railway amongst its policies or aims.

The meeting proved very interesting since synergies were not only discovered with the hosts but also amongst all the STPs present.

Following the welcome from Juan Manuel Jiménez (RTP), there followed a brief round of introductions of all those present:

- Railway STP (RTP). Juan Manuel Jiménez.
- STP with Integrated Intelligence Systems (PROMETEO). Juan C. Dueñas.

- eNEM-eMOV-eisi STP. Antonio Alfaro.
- STP for Safety and Confidence Technologies (eSEC). Sofía Moreno.

- Integral Logistics STP (LOGISTOP). Jaime Mira.

- Automotive Components Industry STP. Cecilia Medina.

- Hydrogen and Fuel Cells STP (HFCSTP). María Jaén.

The exchange of opinions and thoughts by platform representatives led to the following agreements:

- Every platform will detect synergies with the research lines on the Railway Technological Platform Agenda
- Project initiatives will be circulated in order to get to know what the various Working Groups are doing
- The Monitoring Committee formed by those attending will meet with certain annual frequency

- 3rd Plenary Meeting at the Hotel Miguel Ángel - Madrid, 13 November 2007

Strategic Plan Publication. Workshop (seeking project ideas).

José Antonio Jiménez Saceda, Director General of SERNAUTO, opened the proceedings together with Jesús Monclús of the CDTI, Delegate on the 7PM - Transport

(including Aeronautics) Management Committee and María Luisa Castaño from the Transport Area Headquarters of the Subdirectorate for Technological Policy of the Ministry of Education and Science, who talked of the 7th Framework Programme and the new R&I and innovation National Plan, respectively. Given the great attendance, the meeting was organised around parallel workshops of the five Working Groups, dealing with the possible projects that may be set up, based on the information collected in this year of the Platform.

- [Participation at the Conference on Synergies and Collaboration Opportunities between the HFC STP and other technological platforms, 15 November 2007](#)

Within the framework of the 3rd Hydrogen and Fuel Cell Industry Meeting, the Spanish Technological Platform organised a Synergies Conference between Platforms in Santiago de Compostela, in order to bring together Spanish Technological Platforms that, due to their activity, nature or lines of action set out in the Strategic Research Agenda, show synergies with Hydrogen and Fuel Cell technologies.

A total of 45 representatives and members of the following Platforms took part in the Conference:

- Wind Power Industry Technological Network- REOLTEC
- Biomass Spanish Technological Platform
- Spanish CO₂ Technological Platform
- Spanish Platform for Electrical Networks
- Fusion Technological Platform
- Nuclear Fission Energy Technological Platform
- Spanish Automotive Components Technological Platform
- Spanish Railway Technological Platform
- Spanish Aerospace Technological Platform
- Spanish Hydrogen and Fuel Cell Technological Platform

The conference started with a welcome to conference participants given by Salustiano Mato de la Iglesia, Director General of Research, Development and Innovation at the Galicia Regional Ministry for Innovation and Industry.

The introductions commenced with the HFC STP, Javier Brey being the one who briefly outlined the aims, mission and main areas of R&D activities proposed by the HFC STP. Each of the Platforms invited then carried out their presentation.

Mariano Gómez of FITSA, Secretary of the WG5, was entrusted with the SERtec presentation, where he stressed the synergies found with the Environment, Energy and Resources group. Some of the lines of action most closely related to Hydrogen and Fuel Cells are:

- Research into advanced biofuels that offer greater reductions in greenhouse gases
- Simplified designs and integration of hybrid components that reduce costs

- Improving components, including the energy storage system (batteries, ultracapacitors), control system, materials and electric motors

- New fuel cell designs that include high temperature membranes, bipolar plates and air and moisture management systems; development of fuel cell vehicles and low carbon content fuels

- Hydrogen storage with the aim of improving the costs and performance of the fuel cell system

- Development of hydrogen production and distribution paths with low costs and reduced greenhouse gas emissions

- Development of advanced low cost and high durability emission control systems

- Research into vehicle e systems including engine, exhaust, transmissions, tyres and active noise control systems

- Improved tools that include new design considerations relating to the environment, recycling and waste reduction

- New materials, including composites, which make it possible to build lighter vehicles

As a conclusion the Conference agreed to work on the following actions:

- Based on the first impressions exchanged at the Conference, the HFC STP will hold bilateral meetings with the Platforms invited to assess and specify routes of collaboration between Platforms

- The HFC STP will contrast priority policies covered in the Strategic Research Agendas of Platforms attending with the priority policies of the HFC STP Strategic Research Agenda to establish, as far as possible, the criteria that make it possible to establish common recommendations on Platforms

- Participation at the 7FP "Aeronautics and Surface Transport" Infoday - 2nd Call organised by UPM and CDTI, 13 December 2007

- Participation at the "European 7FP Integral Logistics Workshop + National R&D and innovation Plan" organised by LOGISTOP, 22 January 2008

- Participation at the 3rd Coordination Meeting of STPs relating to the National R&D and innovation Plan organised by the Ministry of Education and Science, 19 February 2008

- Coordination Meeting with HFC STP and RTP, 8 March

Taking advantage of the an internal meeting of SERtec WG Chairmen and Secretaries, the technical secretaries of the STPs for Hydrogen and Fuel Cells and the Spanish Railways PTE attended the SERNAUTO offices to present local policies of their strategic agendas most closely related to our Industry and to thereby identify synergies and possible collaboration proposals.

- Presentation of SERtec Project ideas at EuroTrans Day (CDTI), 27 and 28 March 2008

- Tecnoscopia '08 Interview

- Participation in the Consultative Group Meeting of Spanish Energy and Transport Technological Platforms, 8 April 2008

The Ministry of Education and Science called on existing STPs for energy and transport to hold the first Consultative Group meeting. It involved presenting the aims and structures of the different platforms to those attending from Regional Ministries so that they could find out what has been done so far and to allow them to define their interest in participating.

First, María Luisa Castaño presented the Ministry of Education and Science's view of the

STPs' future perspectives and action plans and, following this, all the STP secretaries attending gave a short presentation of their aims and structures and the function of their own consultative group.

Following the various explanations, Ana María Lancha explained the mission and working of this new group whose aim is the national and regional coordination of Public Authorities in order to optimise R&D resources. The continuity and frequency of these meetings will be decided in a forthcoming meeting.

There were varied comments from both Regional Government and STP representatives. We the transport STPs decided to hold a meeting (organised by SERNAUTO) when we have received the minutes in order to give an agreed reply.



- Start-up of the Pedestrian Protection Forum, 9 April 2008

Created as a consequence of the Pedestrians project that SERNAUTO is carrying out together with IDIADA, INSIA-UPM and Centro Zaragoza and whose aim will be to coordinate and make proposals for action to protect pedestrians, its purposes being:

- To update the state of the art for protection systems.
- Analysis of current national/European legislation regarding pedestrian's protection.
- Analysis of European/national projects related to pedestrian safety.
- Possible proposals for new projects.
- Monitoring project results.
- Analysing the degree to which pedestrian protection systems analysed in this project have been diffused in vehicles.
- Representation on international working groups related to pedestrian protection.
- Participation at the TRA-Transport Research Arena Europe - Ljubiana, Slovenia, 21-24 April 2008
- Participation at the Plenary Meeting of the European eSafety Forum- Ljubiana, Slovenia, 25 April 2008

- Participation at the Eureka Profactory Brokerage Event - Gothenburg, 5-6 May 2008

- Coordination meeting of Transport Sector STPs. Creation of Transport Sector Advisory Group Monitoring Committee together with the RTP, LOGISTOP, the Maritime STP and the Aerospace STP, 19 May 2008

As a result of the Advisory Group organised by the Ministry of Education and Science on April 8 and based on the minutes sent by the latter, the Spanish Technological Platforms in the Transport Sector held a meeting to analyse the results of the Consultative Group meeting and to define a common position in this respect.

The meeting was attended by:

Carlos Sánchez	Maritime TP, MTP
Miguel Ángel Llorca	Aeroespace TP
Javier Romero	Aeroespace TP
María del Mar Sacristán	Railway TP, RTP
Cecilia Medina	Automotive Components TP, SERtec
Fernando Liesa	Integral Logistics TP, Logistop

The agreement was conveyed to the Ministry:

- The STPs in the Transport Sector support the creation of a General Advisory Group for the Transport Sector to embrace state and regional authorities with powers/interests in the Sector, meeting twice a year with the participation of at least one representative from each of the STPs in the Sector: Maritime TP, Aerospace TP, Railway TP, Automotive components TP and Integral Logistics TP.

- As a means of providing integrated sector proposals and of conveying them to the Advisory Group, it has been decided to create a Monitoring Committee for this Advisory Group made up of the STP coordinators: Miguel Ángel Llorca from the Aerospace TP, Fernando Liesa from Logistop, Carlos Sánchez from the Maritime TP, Juan Manuel Jiménez from the RTP and Cecilia Medina from the SERtec TP, who propose active participation in establishing schedules for consultative group meetings, as well as identifying the specific stakeholders to be called upon in order that both the Public Authorities and the STPs take as much advantage as possible from this consultative group.

- Participation at Tecnoscopia '08 World - Café
- WG5 working meeting. Launch of Innovation Assessment Campaign for the Automotive Component Industry, 17 June 2008

This was the first meeting with Miguel Granda from R. Bosch as Chairman of the group.

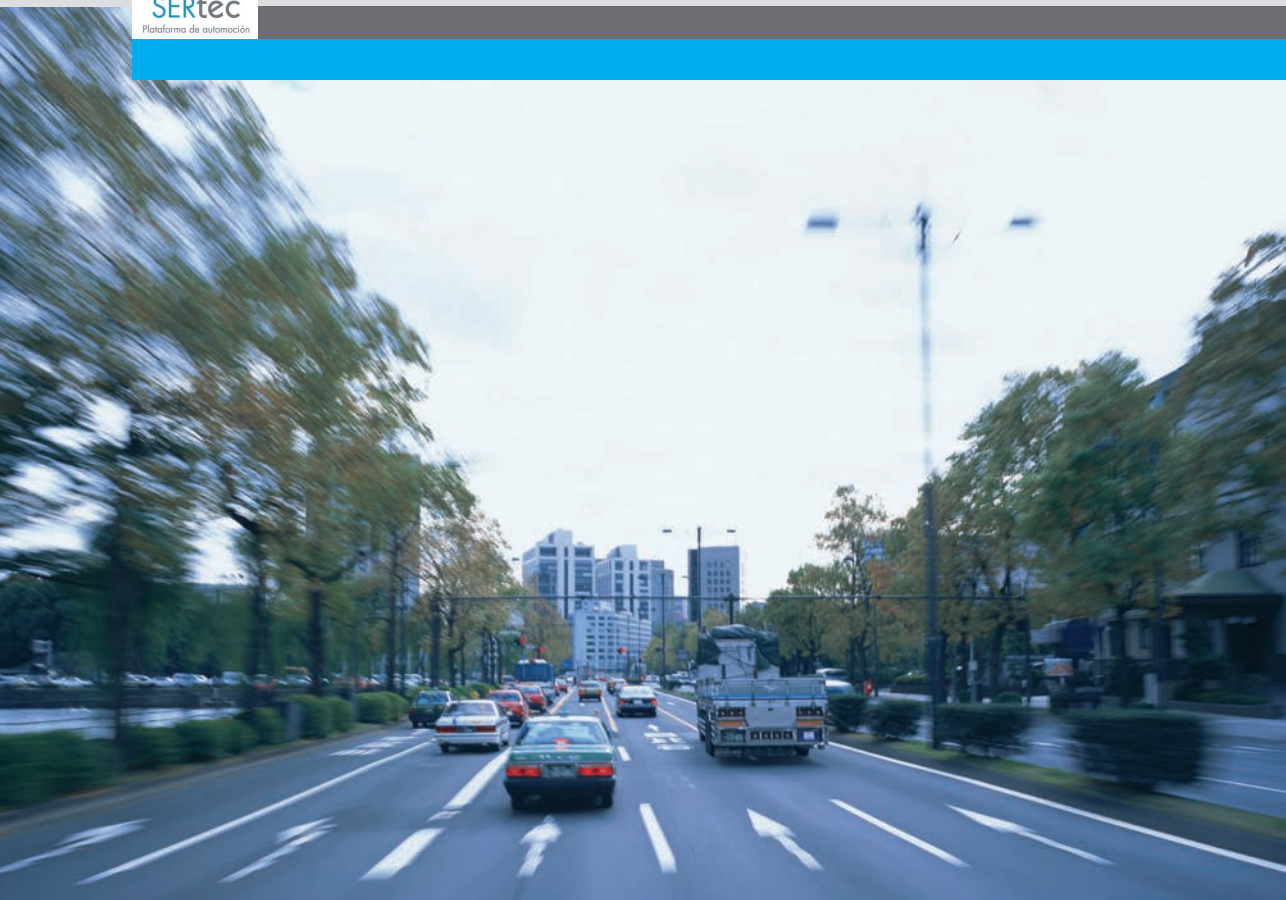
As well as presenting the results obtained in relation to priorities marked out at the beginning by this group and looking for new activities, the Innovation Assessment Campaign for the Automotive Component Industry was also launched.

The campaign is jointly headed by SERNAUTO and SERtec with the collaboration of the FITSA Foundation, in order to be able to make the maximum use of the plan's possibilities.

The aim is:

- To obtain information about the situation of the industry and its need for support in areas of technological innovation
- To achieve a sample of at least 90 companies in the Industry that can supply information about these two areas: technology and innovation
- To spread its results at plenary meetings of SERtec

To obtain the necessary information from companies and to thereby achieve the aims set out, use will be made of the HEVATEC® tool that has been developed by FITSA and placed at the disposal of this campaign.



Workshop days will be organised with the support of hosting organisations and attended by SERNAUTO, SERtec and FITSA who will be equipped with computer means for practical interactive development.

- **ERTRAC meeting, 5 September 2008**

At the request of the EC, ERTRAC organised a meeting in Budapest with representatives of national initiatives that could have a general or specific relationship with ERTRAC in any area. Representatives from 11 countries attended and 9 of them presented both platforms created in the image of ERTRAC (mirror groups-Hungary, Slovenia, Poland) and

platforms or national initiatives partly focussed on the initiatives (Spain with SERtec and Logistop, Austria, Finland, Holland, Sweden and Turkey). The EC representative, A. Siegler, in charge of the surface transport unit of DG Research, underlined the importance of coordinating ERTRAC activities with those of national platforms and initiatives in order to coordinate the contents of R&D working programmes in this area. W. Steiger, Chairman of ERTRAC, invited those attending to ask for the active participation in ERTRAC, insofar as they cover platform areas of interest and accept the operating rules of the latter.

- Monitoring Committee of the Transport Sector Advisory Group: LOGISTOP Steering Committee Meeting, 23 September 2008

Fernando Liesa, as LOGISTOP coordinator, invited the Monitoring Committee to the Platform Steering Committee meeting as a way to get to know and compare internal operating methods.

- 1st working meeting of the Pedestrian Protection Forum, 30 September 2008

The first working meeting of the Pedestrian Protection Forum was held at the Madrid Directorate General for Traffic (DGT) Assembly Room.

Cecilia Medina, as Secretary of SERtec, will be responsible for the secretariat of the Forum and Anna Ferrer, Director of the National Road Safety Observatory, will be Chairwoman.

This meeting set out the aims and established three research areas, headed in principle by the instigators of the proposals:

- Accidentology: Centro Zaragoza
- Vehicle and infrastructure - Legislation and systems: IDIADA
- Assessing the effectiveness of technology: INSIA

For the next meeting, both the DGT and the others attenders considered it useful to

update the state of the art with respect to all the technologies involved.

- Innovation Assessment Campaign for the Automotive Component Industry- Zaragoza, 23 October 2008

Organised by the OTRI at Zaragoza University, the conference was attended by Julio de Juan, Coordinating Area Head for Automotive Programmes at the Directorate General for Industrial Development of the Ministry of Industry, Tourism and Trade and Yolanda Benito, Transport and the Environment Area Head of the Subdirectorate for the Coordination of TCs and Technological Scientific Platforms of the Ministry of Science and Innovation.

As well as developing the practical part in which companies used the HEVATEC tool to include their data and to progress in diagnosis that can direct their innovation plans within the industry context, it offered the chance of holding bilateral meetings between the latter and University researchers to facilitate contacts and future collaboration projects.

The most important conclusion was to encourage companies to promote their R&D activities in these times of economic crisis in order to ensure a better position in the market when this recovers. In this respect, the initiative allows companies to know their technological situation with respect to the industry and to take the consequent measures in time to consolidate or re-orientate their R&D strategies.

- 13th Congress for Quality and Environment in Automation. Award of Q-Innovauto 2007 prizes, 30 October 2008

Special mention to the work carried out by the Spanish Technological Platform for the Automotive Components Industry-SERTec

- Automobile and Climate Change Conference organised by the Chamber of Commerce, Industry and Shipping of Guipuzcoa, 30 October 2008

As a result of the contacts and contributions made by members of WGs, both at working meetings and in other types of events promoted by the Platform, several R&I and innovation project proposals have been launched to national programmes, such as

the former PROFITS and CENITs. The support of the Platforms for projects will be positively considered in their assessment by the Ministry of Science and Innovation.

TOWARDS AN UPDATE OF THE STRATEGIC AGENDA

Taking into account the new priorities marked out by the ERTRAC European Platform (ERTRAC Research Framework "Steps to Implementation", March 2008), the points to be reinforced in each research area have been identified:

URBAN MOBILITY

The Mobility, Transport and Infrastructure WG4 responds to the activities of this priority, always taking into account necessary collaboration with:



- STPs for Information and Communication Technologies (ICTs) (eMov) and LOGISTOP in information technology areas
- The Construction Platform, the STPs for ICTs and LOGISTOP for new urban traffic management systems and the transport - infrastructure relationship.
- FUTURED and STPs for ICTs in researching new concepts for vehicle design (reducing emissions, noise and vibrations, electrical vehicles)

It is also important to coordinate efforts with the RTP, trying to respond to specific problems nationally like interurban mobility in large cities, developing intermodal platforms with connections between various transport modes.

ENERGY, RESOURCES AND CLIMATE CHANGE

This priority is considered in the Energy, Resources and Climate Change WG1 together with the Design and Production Systems WG3 for researching into the new materials necessary in new vehicle concepts (modularity, weight and noise reduction).

The new fuel formulations (bio-fuels) and the energy savings tackled by the Energy Platforms shall be confronted together with SERtec policies relating to research into engines in search of the “zero emissions” target (hybrids, electric motors and flexible in fuel).

The contribution of LOGISTOP, the STPs for ICTs and the Manufacturing Platform is also necessary with respect to energy savings

through mobility and traffic management, and the design of roads, regions and cities.

In collaboration with the WG5 and training subjects, eco-friendly driving should also be considered, also covered by aspects related to ADAS at WG4, as a new working policy in the challenge to reduce emissions.

LONG DISTANCE FREIGHT TRANSPORT

Freight transport is clearly represented by the LOGISTOP Platform, although some related activities are dealt with in the Design and Production Systems WG3 and the Mobility, Transport and Infrastructure WG4 (modularity, new designs, etc.) and in the WG2 (being understood as safety and security).

ROAD TRANSPORT SAFETY AND SECURITY

There is a very close relationship here between the Safety WG2 and the Mobility, Transport and Infrastructure WG4 although, as its name suggest, it is the first that specifically deals with these activities.

Both in research for the driver and for the vehicle, it is vital to collaborate with the STPS for the ICTS, even in the relationship with infrastructure (V2V - V2I) for traffic information systems, road conditions and climatology.

Security is particularly important in freight transport, not only due to the dangerousness of the driver in vandalism or criminal acts but also due to the risk of environmental impact, such as water pollution with dangerous goods due to intentional or unintentional accidents. Seeking solutions to these cases involves collaboration

between several platforms, the STPs for ICTS, the Manufacturing Platform and PESI.

Human factors and the interaction of users (HMI) with all the devices included both inside and outside the vehicle should also be taken into account. Communication between systems fitted in vehicles and the driver should be carried out so their attention is not distracted from traffic requirements. Their participation is also vital, within the same WG2, in initiatives launched on road safety such as the Pedestrian Protection Forum created as a result of "Industrial Research into Pedestrian Protection following a Study into the Extent of Traffic Accidents" in which SERNAUTO participated together with Centro Zaragoza, IDIADA and INSIA.

As mentioned above, the creation of an additional working group at SERtec should be stressed, unlike at ERTRAC, and responsible for specific subjects relating to R&D and innovation management and promotion (WG5).

The aims of this group have been set out in line with the Spanish scenario and are grouped into the following areas of action:

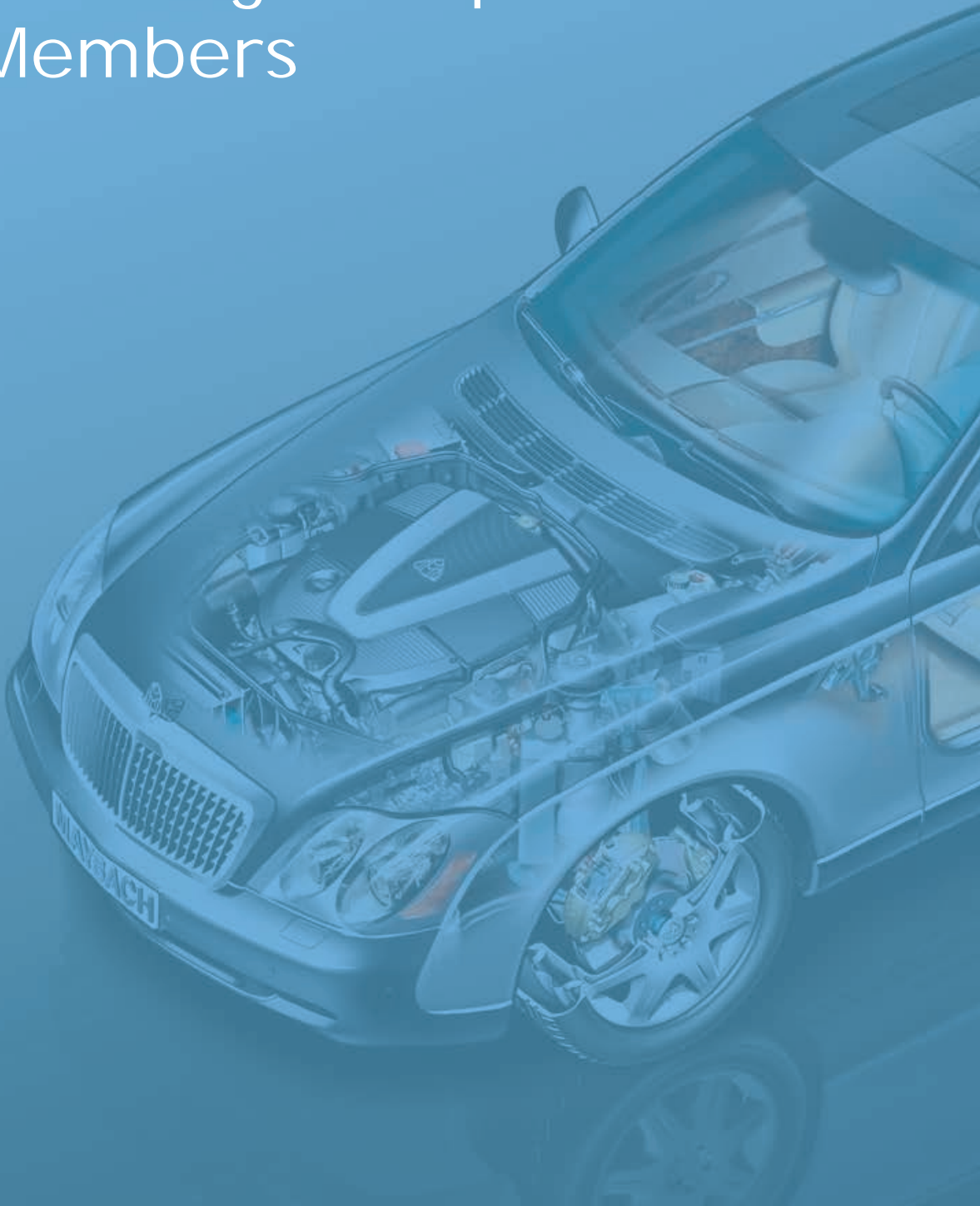
- R&I and innovation promotion policies. Direct aid to all levels and tax incentives
- Specific industry training needs
- Future information and technological monitoring
- Linking supply and demand. Internationalisation

In all cases it is very important for the Public Authorities to intervene, due to the influence and changes needed in existing policies and as managers of R&D and innovation support policies. Their contribution via the Consultative Group and their role in promoting coordination amongst the range of national platforms that exist, unique in Europe, is a key factor in achieving the aims of SERtec.



6. Annex 1.

Working Groups Members



GT1: Environment, Energy and Resources

Entities	Name
ACUSTTEL	Vincent Marant
AIMPLÁS	Pilar Martínez
AMES	Juan Antonio Bas
ANÁLISIS-DSC	Juan Enríquez
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BESEL	José Sierra
CIDAUT	Francisco Tinaut
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CTAG	Vanessa Ventosinos
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	Juan Luis de Miguel
CIDAUT	Jose M ^a Malo
	Raúl Recio
CITEAN	Jose Javier Gil
	Jorge Biera
	Luis Álvarez de Eulate
CTAG	David Sánchez
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CTAG-IDIADA	Javier Pérez
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EUVE	Luis Usatorre
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FITSA	Donia Razazi
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	Francisco Ramos
	Gabriel Renom
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GRUPO ANTOLÍN	Fernando Rey
	FranciscoJavier Martínez
	Pablo Soto
GRUPO COPO	Noelia Lorenzo
INASMET	Cristina Jiménez
	Gonzalo Lilly
	Ricardo Mezzecasa
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	Pedro Mª Olaeta
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GT3: Design and Production System

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GT4: Mobility, Transport and Infrastructure

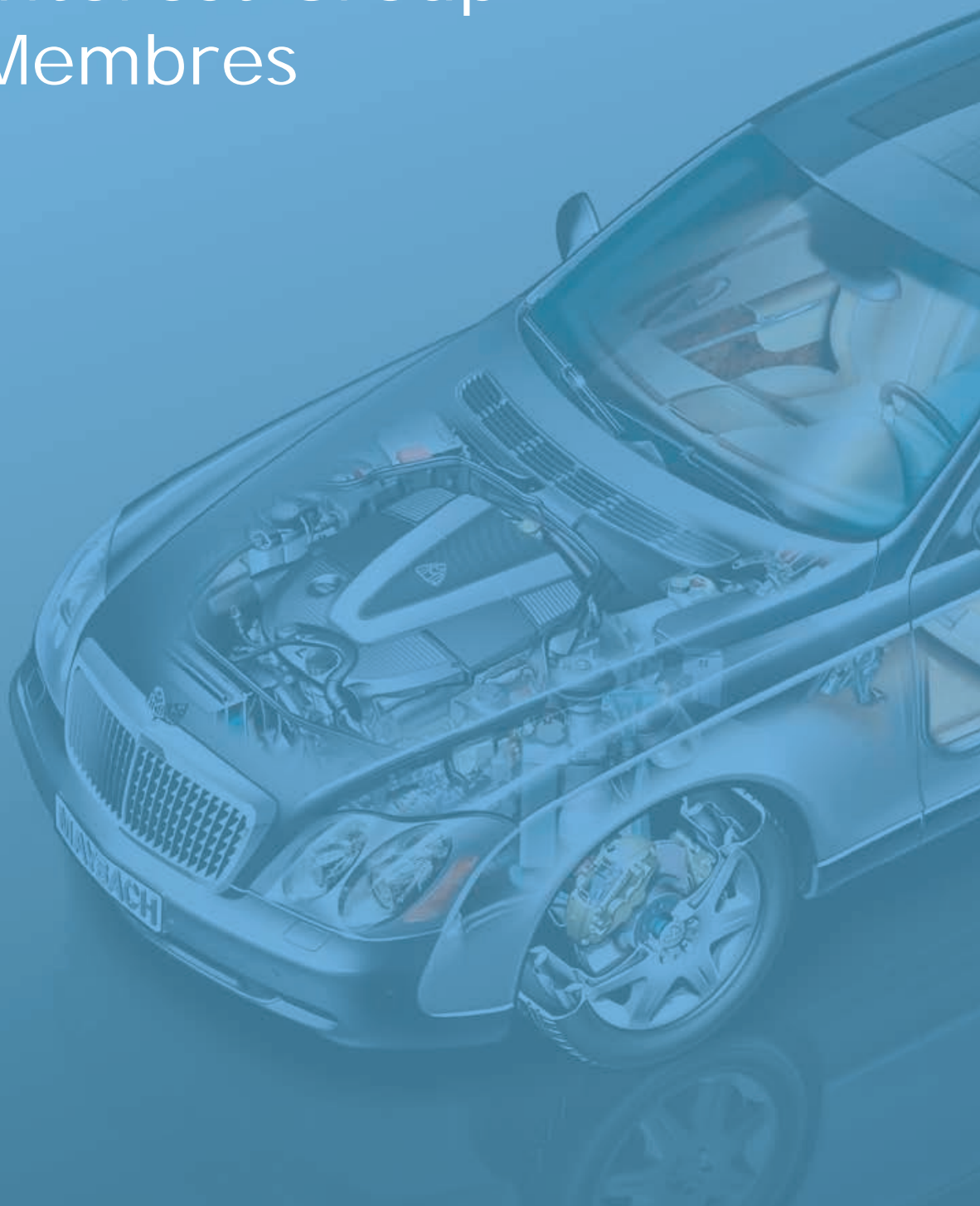
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TECNOEBRO	Serafín Olcoz
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GT5: Managing and Promoting R&D and innovation

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7. Annex 2.

Interest Group Membres



Entities

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EVERIS
F. INICIATIVAS I+D+i
INCOTEC, SLL
ITCL
ITS ESPAÑA
PRICEWATERHOUSE COOPERS
ROSE VISIÓN
TRANSAVAL
WILLEMS VAN DEN WILDENBER



